



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,176	11/14/2003	Bryan M. Cantrill	03226.340001; SUN040170	7068
32615	7590	03/10/2006	EXAMINER	
OSHA LIANG L.L.P./SUN 1221 MCKINNEY, SUITE 2800 HOUSTON, TX 77010			MASDON, DAVID T	
			ART UNIT	PAPER NUMBER
			2188	

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/713,176

Applicant(s)

CANTRILL, BRYAN M.

Examiner

David Masdon

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>02/05/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) was submitted on 2/05/2004. The submission is in compliance with the provisions of 37 CFR 1.97 and 1.98, except as noted below. Accordingly, the information disclosure statement is being considered by the examiner, except as noted below.

The VTrace article on the Microsoft website is not being considered because the hyperlink provided does not link to any relevant document.

Drawings

2. The drawings filed on 11-14-2003 have been approved by the examiner.

Claim Objections

3. Claims 8,11,18 objected to because of the following informalities: the letter 'a' (line 8) needs to be changed to the word 'in'.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2188

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-7, 9-10, 12-17, 19-29 rejected under 35 U.S.C. 102(e) as being anticipated by Burton et al (US 6,874,074).

With regard to claim 1, Burton et al discloses a method of dynamically allocating a variable in a tracing framework, comprising:

allocating a dynamic memory in the tracing framework having a plurality of data chunks; [(resources may be allocated dynamically) column 1, lines 30-45]

placing at least one of the plurality of data chunks onto a free list; [(free memory table) column 3, lines 46-48]

allocating the at least one of the plurality of data chunks on the free list to store the variable and removing the at least one of the plurality of data chunks from the free list; [(a gray object may be a memory object in use and should not be reclaimed) column 7, lines 1-22]

de-allocating the at least one of the plurality of data chunks and placing the at least one of the plurality of data chunks on a dirty list; and [(allocated memory table to reflect allocation of memory) column 4, 6-14]

cleaning the at least one of the plurality of data chunks on the dirty list using a cleaning procedure to place the one of the plurality of data chunks on the free list. [(garbage collector reclaims memory objects by adding them to a free memory table) column 4, lines 46-67]

With regard to claim 2, Burton et al discloses the method of claim 1, further comprising:

associating the dynamic memory with a consumer dynamic memory state.

[(procedure may use marks to indicate status of memory objects) column 6, lines 55-65]

With regard to claim 3, Burton et al discloses the method of claim 2, further comprising:

setting the consumer dynamic memory state after searching for at least one of the plurality of data chunks to allocate. [(after being visited by the garbage collection procedure, a memory object may be marked) column 7, lines 1-22]

With regard to claim 4, Burton et al discloses the method of claim 2, wherein the consumer dynamic memory state is set to empty if all of the plurality of data chunks are allocated. [(a white mark may denote an object not in use) column 7, lines 1-22]

With regard to claim 5, Burton et al discloses the method of claim 2, wherein the consumer dynamic memory state is set to dirty if all of the plurality of data chunks are either allocated or on the dirty list. [(newly allocated marks may be marked gray) column 7, lines 1-22]

With regard to claim 6, Burton et al discloses the method of claim 2, wherein the consumer dynamic memory state is set to rinsing if all of the plurality of data chunks are either allocated or on a rinsing list. [(a referenced flag to be indicative of whether a memory object is available for reclamation) column 13, lines 19-31]

With regard to claim 7, Burton et al discloses the method of claim 2, wherein the consumer dynamic memory state is set to clean after executing a cleaning procedure. [(a scanned flag to indicate garbage collector has completed its processing of memory object) column 13, lines 32-45]

With regard to claim 9, Burton et al discloses the method of claim 1, further comprising:

querying a clean list for one of the plurality of data chunks if the free list is empty; and [(allocator may search a table of free memory to identify a portion of available memory) column 11, lines 61-67]

moving one of the plurality of data chunks from the clean list to the free list if the clean list is not empty. [(deleting a memory object's entry and updating the free memory table to include the memory object's portion of memory) column 12, lines 19-33]

With regard to claim 10, Burton et al discloses method of claim 1, further comprising:

determining whether the variable has been previously allocated; and [(entries tested to determine whether the entry is a pointer) column 7, lines 50-67)

not allocating the variable if the variable has been previously allocated. [(may release memory that has been previously allocated) column 4, lines 31-46]

With regard to claim 12, Burton et al discloses the method of claim 1, wherein the dynamic memory is associated with a consumer. [(pool of dynamic memory shared by a group of user tasks) column 3, lines 53-66]

With regard to claim 13, Burton et al discloses the method of claim 1, wherein a size of the data chunk is static. [(resources may be allocated to a task statically) column 4, lines 13-30]

With regard to claim 14, Burton et al discloses the method of claim 1, wherein the dynamic memory is indexed using a hash table. [(memory allocation entries may be stored in hash table) column 13, lines 1-7]

Claims 15, 27 are a combination of the limitations of claims 1 and 2, and therefore rejected with same rationale.

Claims 16, 17, 20, 28, 29 rejected with same rationale as claim 1.

Claim 19 is rejected with same rationale as claim 12.

Claim 21 rejected with same rationale as claim 3.

Claim 22 rejected with same rationale as claim 4.

Claim 23 rejected with same rationale as claim 5.

Claim 24 rejected with same rationale as claim 6.

Claim 25 rejected with same rationale as claim 7.

Claim 26 rejected with the same rationale as claim 14.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8, 11, 18 rejected under 35 U.S.C 103 (a) as being unpatentable over Burton et al (US 6,622,226) as applied to claims 7, 1, and 17 respectively, and further in view of Dussud (US 6,622,226).

As per claim 8, Burton et al does not disclose expressly a cleaning procedure comprising:

moving one of the plurality of data chunks from the dirty list to a rinsing list if dirty list is not empty; issuing a first cross-call; moving one of the plurality of data chunks from the rinsing list to a clean list if the rinsing list is not empty upon receiving a response to the first cross-call; issuing a second cross-call; and setting the consumer dynamic memory state to clean a response to the second cross-call. However, Dussud discloses a method including traversing memory objects referenced by a program; marking the memory objects reached; adding the memory objects reached to a mark-list; detecting if the mark-list is full; and if the mark-list is not full; avoiding traversing the unmarked memory objects during the sweeping of the memory objects, and reclaiming the memory objects not marked. (column 2, lines 29-45)

Burton et al and Dussud are analogous art because they are from same field of endeavor, namely memory reallocation. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the mark-and-sweep technique of Dussud into the system of Burton et al. The motivation for doing so would have been to speed up the process of memory reallocation. (Dussud; column 2, lines 9-26)

Claims 11, 18 rejected with the same rationale as claim 8.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 6,144,970 – Bonner et al – TECHNIQUE FOR INPLACE REORGANIZATION OF A LOB TABLE SPACE

US 6,598,141 – Dussud et al – MANIPULATING INTERIOR POINTERS ON A STACK DURING GARBAGE COLLECTION

US 6,125,434 – Willard et al – DYNAMIC MEMORY RECLAMATION WITHOUT COMPLIER OR LINKER ASSISTANCE

US 6,076,151 – Meier – DYNAMIC MEMORY ALLOCATION SUITABLE FOR STRIDE-BASED PREFETCHING

US 5,689,707 – Donnelly – METHOD AND APPRATUS FOR DETECTING MEMORY LEAKS USING EXPIRATION EVENTS AND DEPENDENT POINTERS

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Masdon whose telephone number is (571)272-6815. The examiner can normally be reached on Monday - Friday, 7am - 4:30pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571)272-4210. The fax phone

Art Unit: 2188

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM
Thursday, February 16, 2006


3/2/06
MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER